30 okt. 1980

Cost-Effectiveness Evaluative Research in Long Term Care

Alternative Models of Analysis: A Proposal for Substantive and Methodological Research.

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Outline of Contents

	Pages
Introduction	3
Part I: Cost-Effectiveness Research in Social Health Care for the Elderly: Definitions, Issues, and Problems Related to The Basic Model.	5
Definitions for Cost-Effectiveness Research	5
Causal and Efficiency Research Issues in Cost-Effectiveness Analysis	7
The Basic Technique of Cost-Effectiveness Analysis	10
Problems With The Basic Cost-Effectiveness Approach	12
Part II: An Alternative Model for Cost-Effectiveness Research	13
The Causal Connection	13
The Problem of Cause in Evaluative Research	13
Correlation and Cause	15
Correlational Methodology in Evaluative Research	16
An Application of Correlational Evaluative Methodology in Long Term Care	17
Implications of Correlation-based Causal Model Evaluative Research for an Alternative Cost-Effectiveness Research Model in Long Term Care	24
Part III: A Proposed Cost-Effectiveness Evaluation of Loretto Geriatric Center's Noninstitutionalization-Based Services And A Cross-Validity Test of a Model of Analysis Extendable to Community-Wide and Nation-Wide Alternative Services for the Elderly	27
Proposal Overview	27
Objective of Proposed Research	27

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Rationale 28

Background 28

Outpatient Geriatric Services 28

LGC's Registrant Service Program 30

Cost-Effectiveness Models: Unresolved Problems 32

Cost-Effectiveness Models: A Solution 34

Methodology 35

Measurements and Samples 38

Human Subjects 40

Secondary Applications of The Regression-Based Model 40

Specific Aims: Time Table 41

Significance 42

Facilities Available 43

Notes and References 44

Introduction

For good management within services for the elderly, for good gerontological planning within and across local communities and for well informed national policy on aging; valid cost-effectiveness information is needed now on alternatives to institutionalization. It is not through lack of diligence on the part of gerontological researchers that the information is slow in coming. The implementation of valid cost-effectiveness analyses is beset by conceptual, practical and ethical obstacles. In essence, this document proposes an approach to cost-effectiveness analysis which offers a solution to outstanding conceptual problems, which may be readily applied within and across services and communities and which avoids potential abuse of research subjects by not incorporating random assignment to control groups as the basis for scientific inference. In short, a way is proposed to generate useful information now on alternative modes of care of the elderly, for managers, planners and policy makers, before another generation of elderly grows feeble and requires institutionalization.

The validation of a cost-effectiveness methodology based on correlational rather than experimental methodology is proposed. The validation is proposed as part of a cost-effectiveness evaluation of Loretto Geriatric Center's Registrant Services which incorporates ambulatory clinic based, Adult Home Care based and home health care based elements. The research is designed to be of use to the management of this multi-level of care service center. It is also designed to be of use to the Syracuse Consortium to which it belongs and with which it shares the goal of developing a community wide system of case and services management for the elderly. Because the proposed methodology may be readily implemented across services and communities, the test of its validity within the microcosom of Loretto should be of interest to state and federal bodies.

There are two prerequisites for the implementation of the proposed model: an in-place system for periodic, comprehensive assessment of the physical, mental and psychosocial adjustment of the elderly and an efficient computerized system for the storage, retrieval and analysis of data on elderly clientele. As shall be noted later in this document, Loretto Geriatric Center is making significant progress in both these directions and will have both an assessment and computerized information system in place by the fall of 1980, when this research is proposed to begin. Given this fact and Loretto's comprehensive set of services, its selection is logical as a laboratory for the evaluation of innovative gerontological/geriatric services, programs, treatments and ideas. It is within this spirit that an innovative methodology for cost-effectiveness analysis is proposed for Loretto Geriatric Center's Registrant Services.

This report on cost-effectiveness methodology is divided into three parts: the first is on definitions, issues and problems with the basic approach to cost-effectiveness evaluation; the second is on an alternative approach; and the third part is on a proposed test between alternative models.

Part I explores the methodological state-of-the-art of cost-effectiveness analysis. Part II explores basic principles of evaluative research as those principles may be brought to bear on an improvement in the state-of-the-art. The logic of a new model for cost-effectiveness analysis is proposed in this part. The logic of the model is illustrated with an example of research previously done at Loretto. The example serves also to document Loretto's capacity for research of this type. Part III offers details on both the basic and alternative cost-effectiveness methodologies and proposes a validating test of the alternative methodology as well as a cost-effectiveness evaluation of Loretto's Registrant Services. For those wishing a full exposure to the conceptual underpinnings of the proposal, Parts I and II constitute important reading. The practical reader may wish to go directly to Part III, or read it first, as it stands as a unity and summarizes Parts I and II.

Part I: Cost-Effectiveness Research in Social Health Care for the Elderly: Definitions, Issues, and Problems Related to The Basic Model.

Definitions for Cost-Effectiveness Research

Evaluative research is causal research. If cost-effectiveness analysis, a form of evaluative research, is to be properly understood and appropriately applied, the logic of causal analysis must guide its use. To explicate the approach of cost-effectiveness evaluative research, definitions are in order.

Causal research is that mode of systematic inquiry calculated to amass evidence in a manner which supports or refutes the claim that one action, or a defined pattern of actions, is responsible for having brought about a given result. Evaluative research, as an applied form of causal research, is defined, therefore, as "The study of the extent to which a social program is contributing to defined goals of client change (i.e., outcome)."[1] The valid ways in which a piece of research can draw the causal connection between program input and client outcome will be discussed in detail in the next part of this paper. The point must be made now, however, that good evaluative research does not merely describe program effort and change in clientele outcome. The basic cannons of scientific inquiry do not allow one to leap to the conclusion that a program is effective merely because it can be documented that a clientele are changing for the better over time.[2] Even when it can also be documented that program input had improved, in quantity or quality, during the same period of time that clientele improved, one does not have causal evidence in favor of the program. Factors other than the program in question, including other programs and supports, may have brought about the change.

Research geared mainly toward describing effort addresses itself to the quantity and quality of activity that takes place in a program. It helps answer the question, "What is being done?". Research geared mainly toward describing effect addresses itself to the quantity and quality of outcome change in a program's clientele. It helps answer the question "What has happened?". The former kind of research has been referred to as "process" evaluation, and the latter "outcome" evaluation.[3] Neither model of evaluation is adequate and complete to address itself to a documentation of clientele outcome change as a causal function of program input. Only evaluative research can link effect to effort in a causal manner. Once program effectiveness is documented, a higher level of applied causal research may take place--program efficiency analysis.

Program efficiency analysis is concerned with measuring the amount of effort within a given program needed to produce a given effect. Efficiency is defined as the ratio of effect to effort. Obviously, it is meaningful to take such a ratio only if the effort defined and measured is that effort truly causally related to the effect. To include in the denominator of the ratio efforts unrelated to the effect, would result in an unfairly low estimate of efficiency.

To exclude from the denominator of the ratio any significant efforts related to the effect, would result in a biased, high estimate of efficiency. Program efficiency analysis, therefore, must be based on good causal analysis.

When efforts are measured in terms of costs and effects are measured in terms of psychosocial, physical, economic and subjective factors, the mode of program efficiency analysis being employed is cost-effectiveness analysis. Primarily, cost-effectiveness analysis is a method for assessing and comparing the efficiencies of alternative programs.[4] Placed in the context of program efficiency research, it is clear that cost-effectiveness analysis does not have cost as its sole criterion. Yet, the popular misconception remains that alternatives to institutionalization, such as home health care, ambulatory clinic or day care for the elderly, are more cost-effective than institutionalization only if they are less costly alternatives. Relative effectiveness is as important as relative cost and, therefore, cost-effectiveness analysis is more than an accounting procedure. In this regard, cost-effectiveness analysis differs from cost-benefit analysis. The efficiency ratio in cost-benefit analysis, employs monetary criteria to measure benefits as well as costs.[5] The efficiency ratio in cost-effectiveness analysis allows psychosocial, physical and subjective criteria to be employed in the measurement of effectiveness and, by virtue of this, is the more appropriate mode of efficiency research in the field of human services.

Efficiency research in social-health care programs for the elderly, employs effectiveness criteria which derive from the basic program objectives of restoration, improvement, or maintenance of physical, mental, and social functional abilities.[6] Popular operational definitions of these outcomes include the index of Activities of Daily Living (ADL),[7] The Instrumental Activities of Daily Living (IADL)[8] and The Mental Status Quotient (MSQ)[9] which tap respectively, physical, social and mental functioning. The recent history of assessment instruments in long term care is replete with examples of operational effectiveness definitions comprehensive of physical, mental and social functioning.[10] Measurement validity and reliability research has been accomplished or is proceeding on a host of long term care assessment instruments, including New York State's Moreland Act Commission Patient Assessment Form[11], DMS-1 Form and PPAS-1 form, The Patient Classification for Long-Term Care Instrument[12], The Patient Assessment and Care Evaluation (PACE) Instrument[13], The Minimum Data Set[14], and The OARS Multidimensional Functional Assessment Instrument.[15] Recent initiatives by The Federal Government's Administration on Aging extends this work. For example, Loretto Geriatric Center of the AoA/IVE - sponsored Syracuse Long Term Care Consortium, is synthesizing the above listed instruments to create its own comprehensive battery of assessment and effectiveness instruments to be employed across its multiple levels of care (institutional and noninstitutional) for the elderly.

Assessment instruments being tested and in use tend to include measures of service input as well as measures of service outcome, in terms of items on type and frequency of different (multidisciplinary) services provided. Such instruments, therefore, are useful for program efficiency analysis, since they at least

partially measure effort as well as effect. Cost-effectiveness analysis, however, requires measures of effort stated primarily in terms of costs and expenditures and, therefore, requires a data collection system which goes beyond the above discussed instrumentation. For cost-effectiveness analysis, additional input from the accounting function of long term care programs is important.

Money is used as index of cost, although the economic perspective of cost is not necessarily or exclusively one of money. Cost includes benefits foregone in the achievement of a program goal. Money is a convenient indicator for resources used in the attainment of a program goal because it allows for the diversity of human activity and nonhuman resources used in relation to a program to be expressed in terms of a common denominator.[16] Given the complexities of the market place, in terms of accurate cost estimates, efforts in the human services are more practically measured in terms of actual expenditures. Expenditures, however, do not necessarily equal the costs of producing care and may underestimate costs related to the individual's total life-support contribution to care outcome.[17]

Causal and Efficiency Research Issues in Cost-Effectiveness Analysis

Given the practical appeal of using program expenditures for cost estimates in cost-effectiveness analysis, it is important to explore the issues this practice gives rise to in terms of implications for research validity. The use of program expenditures for cost estimates has greatest potential for jeopardizing research validity when used in cost-effectiveness comparisons of institution based and noninstitution based services. It is crucial, therefore, that research designed in the area of alternatives to institutionalization for the elderly be attentive to the following points.

The central issue that must be dealt with has to do with classifying costs in relation to services into primary, secondary, and tertiary levels. The following lengthy quotation from Doherty and Hicks, summarizes the issue well. For illustrative purposes, comparisons are made within the quotation between institutional care and day-care for the elderly.[18]

> To obtain more realistic cost comparisons between types of geriatric care programs than are provided by accounting or per diem rates, different aspects of the cost of the total life support system should be considered. One approach is to classify the services needed to support the elderly according to categories of care and then to apply the appropriate costs. The service groups are (1) primary--services provided by the day-care program, (2) secondary--health and social services provided outside the day-care program, and (3) tertiary--services utilized in living at home.
>
> Primary services are all medical and other health and social services provided directly in the day-care setting. Although there is no standard classification of day-care services, it is convenient for analytical purposes to divide the primary group

into fixed and variable services. Fixed services are the care services all clients receive and which are paid for under a flat fee per patient day. Variable services are optional services which are prescribed according to individual client's needs. These are provided at extra cost and usually minimally include medical and dental care, physical and occupational therapy, and transportation. This method of classifying primary services provides us with a general approach that not only has the advantage of adaptability to any day-care pgoram, but which also will identify and account for differences within and among individual programs.

Secondary services are services needed to support and to complement those provided in the day-care setting. Because day-care clients spend at the most 40 hours per week in the day-care program, it should be expected that some will need additional medical or health-related services. These services, which may be provided at home or in a variety of institutional settings, may include weekend and evening meals, homemaker, medical, and nursing care. The main point in defining this secondary group is to ensure that any social accounting of day care recognize the need for supplementary resource utilization.

Finally, tertiary services are the personal or consumption services normally involved in living at home such as food, housing, and recreation. This category is important because of the interest in comparing the relative resource costs of day care and institutional care. Its inclusion is in recognition of the fact that old people living in the community occupy housing and consume goods and services.

Each of these service categories has associated dollar costs and, to the extent feasible, data should be collected for each category. The reason for this is that a comparative analysis of primary costs, while providing some basic information, may lead to a distorted view of the real comparison. One program could, for example, have high primary costs relative to another program, but might also provide more services. To compare the two programs, one could look at the primary costs, but any inferences in terms of cost-effectiveness would need to account for necessary additional or secondary services utilized by the patients in the program with fewer primary services.

We recognize that because of the great difficulties that sometimes arise in attempts to obtain cost data,

program evaluators will not always be able to examine all three categories of services. Also, some program objectives may be so defined that there would be no need to evaluate beyond the primary level. The advantage of the classification, however, is that it enables these choices to be operationalized and simultaneously provides the researcher with a framework for understanding the consequences of a limited study.

The importance of identifying and estimating the costs of secondary and tertiary services as well as primary services, is best explicated in the contexts of the logic of causal evaluative research and efficiency research which opened this part of the paper. In cost-effectiveness analyses which attempt to evaluate outpatient programs as viable alternatives to institutional care for the elderly, it is important to monitor secondary and tertiary services among outpatients in order to develop inpatient and outpatient cost-effectiveness ratios not spuriously favorable to the outpatient program. For both types of clients, inpatients and outpatients, standard outcome indicators--physical and mental functioning and psychosocial adjustment--are functions of each client's total life support system and are measured in terms of changes over time. Such changes come about as a result of, i.e., are caused by, all elements in each client's total life support system, and not only as a result of the outpatient effort.

The identification of resources expended, on a per diem basis, within the inpatient setting closely approximates resources utilized in the total life support system of each client because of the near self-sufficiency of the institution. On the other hand, the daily or periodic costs of an outpatient program, represent only a fraction of all resources used in the outpatients' total life support system. In the cost to effectiveness ratio for inpatient services, the cost factor is reflective of the scope of the total life support system services. In the cost to effectiveness ratio for outpatient services, costs are reflective only of primary services. Consequently, comparing cost/outcome ratios of this type must bias results in favor of the outpatient services.

Earlier in this paper, evaluative research, of which cost-effectiveness research is a type, was described as research which accurately determines the degree of causal connection between program effort and clientele outcome. Evaluative research is not merely descriptive of effort and effect--the causal connection must be drawn. Program efficiency research, as a form of evaluative research from which cost-effectiveness analysis is more directly derived, was described as analysis which measures the amount of effort needed to cause a given effect and which expresses this relationship in the form of a ratio. Cost-effectiveness analysis is valid and meaningful efficiency research only if its cost estimates of effort are exhaustive of all efforts--primary, secondary and tertiary--which are causally related to effect. Therefore, to exclude from the cost estimates of effort in an outpatient program the costs of secondary and tertiary services is to exclude estimates of efforts causally related to effect and is, therefore, to produce a biased (too high) estimate of efficiency.

The Basic Technique of Cost-Effectiveness Analysis

Although there are many techniques for cost-effectiveness analysis, no technique is adequate which does not produce unbiased efficiency ratios which use costs that neither ignore nor overestimate efforts causally related to measured effects. The basic model in cost-effectiveness research deals with this issue in a straight forward manner. Because cost-effectiveness analysis is a methodology for assessing and comparing the efficiencies of alternative programs, the efficiency ratio of every program involved in the comparison must be produced in an unbiased manner. Therefore, within outpatient programs for the elderly, such as home health care and day care, the basic approach to cost-effectiveness analysis incorporates methodologies for estimating secondary and tertiary costs. One such methodology will be explicated in the third part of this paper.

The basic approach to cost-effectiveness analysis requires other elements in addition to cost data collecting methodologies.[19] The alternative programs to be compared in a cost-effectiveness analysis must have definable program goals which are shared in common. The concrete outcomes which operationalize the attainment of program goals must be applied consistently across programs. The elderly clientele of each program to be compared must be comparable in terms of levels of need. And the effectiveness data collection instruments must be comprehensive of physical, mental and social functioning criteria.[20]

Given these requisites, basic cost-effectiveness analysis may proceed. Typically, the findings of such analysis are organized in a tabular display to facilitate cross-program comparisons along the dimensions of effectiveness and cost.[21] As an example of this type of cost-effectiveness research, a description of recent research by Doherty and Hicks is presented. Involved is a comparison of day care, home care and institutional care for the elderly.[22]

Data for the Doherty and Hicks study were gathered from model program sites in New York and Maryland. The researchers determined *a posteriori* that the clients in the day care, home care, and institutional care programs were comparable on the basis of functional abilities and social characteristics, in that the clients could have served in any of the programs. ADL, IADL and MSQ effectiveness criteria were used in common in all three programs. Primary, secondary and tertiary cost data were collected from the programs, from the clients and from supplemental secondary sources. The researchers note that only the primary cost data were known to be fully reliable. For the presentation of their findings, the researcher used the Kazanowski tabular display approach. Their basic findings are displayed in Table 1.[23]

Table 1. Tabular Display for Cost-effectiveness Analysis of Day Care, Home Care, and Institutional Care.

Program	No. patients in 1st assessment	Effectiveness criterion*						Per diem cost ($)			
		IADL		ADL		MSQ		Total	Primary	Secondary	Tertiary
		No.	Ratio	No.	Ratio	No.	Ratio				
Day care...	45	37	0.82	40	0.88	38	0.84	27.38	18.60	3.20	5.58
Home care..	78	55	0.70	61	0.78	54	0.69	22.43	14.26	2.05	6.12
Institutional care...	60	45	0.75	42	0.70	31	0.52	26.69	25.12	1.57	0

* Number and proportion of patients in first assessment whose function on each scale was maintained or improved in second assessment.

The researchers' interpretation of the tablular display data lead them to conclude that the day-care program is the preferred choice on each of the effectiveness criteria. Home care is the preferred program on the overall cost criterion. Although institutionalization appeared to be less effective overall than its alternatives, it proved to be more effective, surprisingly, on the social functioning criterion (IADL) than home care. Day care was the most expensive program, but not significantly more so than the institutional program. In terms of primary expenditures only, day care is, of course, less costly than institutional care. The researchers conclude by noting, "In the end, the choice that must be made is probably between the effectiveness of day care and the costs of home care. Is the greater effectiveness of day care worth $5 per day? And to whom?"[24]

Problems With The Basic Cost-Effectiveness Approach

The summary of the Doherty and Hicks research does not do full justice to the sophistication of their research which extended into more detailed analyses. Nevertheless, the research does demonstrate problems which limit its validity and, therefore, its generalizability and usefulness. The problems stem not from lack of diligence on the part of the researchers--they do implement the full state-of-the-art in cost effectiveness research--but rather, the problems stem from the poor state-of-the-art. The problems in the state-of-the-art are two fold. First, the basic approach to cost-effectiveness analysis is descriptive of costs and effects and interrelates the two only in terms of cross-tabulation. Because correlation (cross-association) does not imply cause, the analysis does nothing to establish a causal connection between effort and effect. Second, in the basic approach to cost-effectiveness analysis, secondary and tertiary cost estimates tend to be unreliable. Consequently, effort is not adequately measured and the efficiency ratios for outpatient programs are biased, hindering valid comparisons with inpatient programs. In summary, the essential problems with cost-effectiveness analysis in the state-of-the-art today, are related to the fact that basic cost-effectiveness technique has not been designed in conformity with the basic principles of causal evaluative research and efficiency research. In the next part of this paper, an alternative model for cost-effectiveness research is explicated--one whose design derives directly from sound principles of causal evaluative and efficiency research.

Part II: An Alternative Model for Cost-Effectiveness Research

The Causal Connection

A useful model for cost-effectiveness research must adequately amass evidence in support of or in refutation of a causal connection between program input and clientele outcome. It is important, therefore, that this part of the paper begin with a discussion of causal research generally and evaluative research in particular. Illustrative examples are drawn from the human services evaluative literature generally before the focus is narrowed to gerontological research and cost-effectiveness research specifically.

In his book on historic themes in social welfare research, Zimbalist describes evaluative research in the human services as being comprised of six tasks: (1) identification of service objectives; (2) standardization of service content; (3) description of service recipients and target conditions; (4) measurement of change; (5) durability of change; and (6) the causal connection.[25] A case can be made for each task being the crucial task--the task which if successfully accomplished would earn evaluative research recognition as an effective, sophisticated tool skill in the delivery and expansion of human services. Each task offers frustrating obstacles to its successful implementation. This section of the paper focuses on the sixth task, "the causal connection," which Zimbalist describes as perhaps the most difficult of all. The focus is on the sixth task because, as shall be delineated, a solution to this task's key obstacle--the establishment of a causal connection between program process and client outcome without the burdensome use of randomized experimentation--can now be described and readily implemented in most human service agencies.

The Problem of Cause in Evaluative Research

How does one amass evidence in a manner which supports the claim that one action, or a defined pattern of actions, is responsible for having brought about a given result? This is a problem which has been of concern to philosophers and scientists for centuries. The history of human service research also demonstrates this concern. That the matter of the causal connection remains an important one for the human services is not surprising, given today's political climate of accountability within which the human services must rigorously demonstrate their effectiveness in dealing with human and social problems.

The human services' concern with cause, in terms of formal research, dates back at least to 1887 with the publication of Charles Booth's Life and Labour of the People of London--a "scientific" study of the "causes of pauperism."[26] Among other variables, Booth examined, through cross-tabular correlational technique, "drink," "immorality" and "laziness" as causes of pauperism. One problem which plagued this research is one which still plagues evaluative research today: correlation does not imply causation. That is, that alcoholism and poverty are correlated may imply that alcoholism causes poverty; however, it may also imply

with an equal amount of credibility or lack of credibility that poverty causes alcoholism, or that alcoholism and poverty are together caused by some third variable.

Because the limitations of correlational research became widely known in human services research, randomized experimentation became the preferred mode of research by the 1950's.[27] It became the preferred mode of research from a perspective of scientific validity. From the perspectives of practicality and ethics, the limitations of randomized experimentation also became well known.[28] Nevertheless, because of social researchers' concern about effective amelioration and, therefore, about demonstrating cause, randomized experimentation is part of the human services' evaluative research history.

From the causal perspective, evaluative research may be defined as the study of the causal linkages between program processes and changes in client outcomes. Attempts to explore the links between program and outcome in the human services, go back at least to 1906 with Lillian Brandt's research to evaluate the effectiveness of family adjustment services.[29] She relied basically on social workers' subjective judgments. However, attempts to amass definitive evidence to demonstrate causal linkages between program and outcome begin in the 1940's with use of the randomized experiment in the field.

In this vein, a classic study, published in 1951, was the Cambridge-Somerville Youth Study which was described as an experiment in the prevention of delinquency.[30] The study probed the effectiveness of counseling on delinquent behavior by comparing 325 pairs of boys, matched on the basis of demographic, personality, family and environmental factors, within a treatment and a control group. For each pair of boys, one boy was assigned to the treatment group and one to the control group on a random basis (the toss of a coin). At the end of the treatment period no significant differences were found between the two groups.

Had differences in delinquent behavior been found between the treatment group and the control group, the logic of the randomized experiment would dictate that the differences be causally attributed to the program. This is true, in large part, because the randomized experiment allows the researcher to assume that only statistically negligible differences exist between the two groups at the beginning of the experiment and that by the end of the experiment any significant differences between the two groups cannot be attributed to factors other than the program. It is recognized that factors other than the program may have brought about client changes in the treatment group, but since the control group is assumed to have been exposed to the same factors at the same time as the treatment group and, therefore, had likely experienced the same changes, these other factors would not explain any net differences between the two groups at the end of the experiment.[31] It is assumed that the only consistent difference between the two groups throughout the experiment had been the treatment offered one of the two groups. Given these assumptions, one may logically conclude that, in relation to the Cambridge-Somerville Youth Study, the counseling program for delinquency was not effective.

As noted previously, other randomized experiments in evaluative research

followed the Cambridge-Sommerville Youth Study in the 1950's. The strong trend toward randomized field experiments did not continue into the late 1960's because of the practical and ethical problems associated with field experimentation. The procedure often involves prohibitive expense and elaborate administrative set-up for the process of choosing, randomly assigning and tracking individuals in different groups. Ethical problems associated with the randomized field experiment often follow, as noted previously, from the willful denial of services to people in need during the creation and use of the required control group.

Correlation and Cause

Correlational methodology, as will be further explicated in an example in the last part of this section of the paper, does not necessarily involve the creation of a control group and random assignment to different groups. It explores associational patterns among variables as those associations occur naturally in the field. Correlational methodology is not prohibitively expensive since it can be applied to data culled from existing agency records. Because a randomly assigned control group is not logically required, correlational technique does not involve the willful denial of services to needy clienteles. Does correlational methodology, however, allow the evaluative researcher to amass evidence supporting a claim of program effectiveness, i.e., a claim of causal linkage between program process and client outcome, when a program is in fact effective? The answer to this question, to be defended in this paper, is a qualified yes. Simple correlation does not offer valid causal evidence, but analysis of covariance, as a correlational procedure involving control variables rather than control groups, may when appropriately applied.

The logic underlying the analysis of covariance procedure may be explained as follows. When research subjects are not randomly assigned to treatment and control conditions, there exists the danger that if differences are found between those who did participate in a program and those who, for whatever reason, did not participate, those differences cannot be attributed to the program. This is true because any differences found between two such groups at the end of the research period may be reflective merely of differences existing before intervention. There are reasons why some individuals of comparable need do select or have themselves selected for a program and some do not. These reasons may affect outcome, independently of intervention. Even when it can be demonstrated that no significant differences existed between the two groups (the treatment and the natural control group) on measured variables before intervention, one cannot be certain that all the important variables were known and measured to make the pre-intervention comparison valid. It is of crucial importance, therefore, that in nonexperimental evaluation, the researcher be able to estimate that portion of post-intervention differences which should be attributed to pre-intervention differences. Analysis of covariance does this precisely. It allows for a comparison of past-treatment outcome scores for both treatment and non-treatment groups after correcting for pre-treatment differences.

Although analysis of covariance can be an ethically and practically sound methodology, it is not widely accepted as a scientifically valid alternative to the randomized experiment. This is so because, although it attempts to correct for pre-treatment differences, the sources of the differences are not

always known and, when known, not accessible to perfect quantitative measurement.[32]

Correlational Methodology In Evaluative Research

Applied appropriately, however, analysis of covariance can be a scientifically valid alternative to the randomized experiment. Happily, the conditions which maximize appropriate application are often to be found, or can readily be developed, in the circumstances under which evaluative research is usually done in the human services. It is the criteria for the appropriate application of analysis of covariance that this section of the paper intends to present and their compatibility with field research conditions that this paper intends to document. First, however, it is important to note another fact about the randomized field experiment.

Analysis of covariance is often written about as a practical or ethical alternative to randomized experimentation, as if the randomized experiment were of absolute scientific validity. It is not the case that the randomized field experiment offers perfectly valid and interpretable results. In field situations, the randomized experiment is plagued by at least two problems affecting its scientific validity: (1) some individuals randomly assigned to a program refuse to participate or participate at significantly different levels of intensity; (2) some individuals randomly assigned to a control group may become demoralized by virtue of not being assigned treatment.[33] Lack of participation, differential participation or resentful demoralization each have the same effect. Each renders the researcher incapable of attributing treatment group and non-treatment group differences to the program. In some field situations, therefore, the randomized experiment is no more scientifically valid than analysis of covariance misapplied. Consequently, analysis of covariance appropriately applied serves not merely as a scientifically valid alternative to randomized experiment, but as the most useful methodological approach to evaluative research from the combined perspectives of practicality, ethics and scientific validity.

Analysis of covariance is appropriately applied for evaluative research purposes, that is, analysis of covariance is applied in an unbiased manner which neither underadjusts nor overadjusts for pre-existing differences, when the measurement instruments used to measure outcome are also used as the treatment selection criteria (as opposed to self-selection on the part of subjects).[34] This is true for the following reasons. Analysis of covariance is biased to the extent that the measurement of covariates (the variables which represent pre-existing treatment group and non-treatment group differences) is not perfect and to the extent that the theory which offers an understanding of the self-selection process for services is inadequate to identify all covariates. Imperfect measurement and inadequate theory characterize all evaluative research situations in which clients select themselves for treatment. However, when selection for program is guided by the instruments used to measure outcome (rather than their underlying constructs) imperfect measurement is not a problem because the test scores themselves guide the decision making and not the concepts that theory may represent (e.g., a score of four on a nutrition scale of zero through 10 may guide admission to a Title III program rather than "poor nutrition"). In this situation, the actual and known administrative practice in client selection replaces the need for perfect theory and, consequently, for perfect measurement. Since, at many human service agencies, administrators and

practitioners wish to reserve the right to determine who is most appropriate for treatment, rather than leave the matter to random selection and chance, analysis of covariance is an administration facilitating methodology because it should require that client selection criteria be made explicit for statistical control and correction purposes.

For an explication of a specific correlational technique for evaluative research, which can be used in most human service settings where the criteria for treatment selection can be made explicit, the reader is referred to a discussion of the regression discontinuity design.[35] For illustrative purposes, before narrowing the focus to cost-effectiveness research, this section concludes with the summary of an application of correlational methodology to an evaluation of a social services effort to reduce relocation stress among institutionalized elderly. The purpose of this summary is to illustrate causal model evaluative research before extending its model to cost-effectiveness evaluation. Cause oriented evaluative research of this type requires agency record keeping systems which are comprehensive of selection, service input, and client outcome measurements, and the availability of computerized statistical packages.

An Application of Correlational Evaluative Methodology In Long Term Care

In 1975, 200 intermediate-care and skilled-care residents of Loretto Geriatric Center in Syracuse, New York, were transferred to a new 520-bed facility. Under the coordination of Loretto's Social Services Division, a relocation work plan was developed aimed at decreasing the residents' vulnerability to move related stress. The primary strategy involved an attempt on the part of the staff to increase the predictability of the new environment, and in the process by which that goal would be met, to stimulate greater resident involvement and participation in the move related decision-making processes prior to and during the relocation.

At meetings of the American Gerontological Society, research findings were put forth to indicate the efficacy of this strategy in terms of dampening effects on mortality, morbidity and adverse psychosocial reactions among the residents in the post-move period.[36] The methodology employed for this evaluative research was correlational, based on path analysis and analysis of covariance. Path analysis is a regression based technique for determining the direct and indirect associational patterns among variables. Because path analysis is a regression based technique, it may be combined easily with analysis of covariance i.e., associational patterns may be determined after covariates are controlled. The situation often arises in relocation planning that a control group cannot be incorporated into a research design. To deny services to needy clientele for experimental purposes is considered by many to be an unethical practice. It was important, therefore, that a correlational method of analysis be employed. To place the methodology within a concrete context, a few words are necessary about the intervention strategies used at Loretto Geriatric Center.

To reduce fear about the unknown aspects of the move and of the new environment, pre-move tours of the new facility were conducted. Maps of the new facility were distributed to residents, along with descriptions of window size and types of built-in furnishings and equipment. Pre-move interviews of the residents were conducted in order to ascertain their environmental and social preferences for the new facility. Among other things, they were asked to state their preferences for floor level assignment, location on floor, window view, room color, types of furnishings, corridor neighbors and assigned staff. This latter effort, it was anticipated, would help reduce feelings of powerlessness among residents by encouraging their input.

Relocation-related stress is usually evaluated in terms of the comparison between pre-move and post-move adjustment levels among the residents--with or without the benefit of a control group.[37] The key feature of the Loretto relocation-stress research, which did not employ an experimental design and, consequently, did not use a control group, was a shift in the basis of analysis from the change score, i.e., change in adjustment over time from the pre-move to the post-move period, to the correlation between stress-vulnerability and post-relocation adjustment. In addition to allowing for the application of analysis of covariance and path analysis, the use of correlations between stress-vulnerability variables and post-relocation adjustment variables as bases of analysis are intuitively appealing. In a correlation by correlation approach, factors which are shown to reduce a given stress-vulnerability/post-relocation adjustment variable correlation, by means of a path model technique for example, are factors which should be paid attention to in terms of their value for planning intervention strategies for the mitigation of move related stress. The control variables tell us something about the links between stress-vulnerability and the manifestations of stress, and the points at which the links may be broken.

In this summary of the research, attention will be confined to the intervention efficacy of pre-move tours and fulfilled preferences in relation to the stress-vulnerability factor of volition and its impact on self-perceived health among the residents. Controls are employed on those variables which were used to select residents for pre-move tours of the new institution and which were used to assign high priority for preference fulfillment in the new environment.

Voluntary participation in residential relocation has been recognized as an important factor in determining the consequences for adjustment during and following a move.[38] The necessary closing of the old facility at Loretto imposed a relocation upon the residents, many of whom expressed preferences not to move (38.3% of the residents indicated negative attitudes about the prospect of moving, 33.0% expressed indifference and 28.7% indicated positive attitudes). Was stress that may be related to the volition vulverability factor successfully alleviated by service intervention? Toward the objective of answering this question, morbidity, psychosocial adjustment, coping ability, social service utilization and social relations information were collected during pre- and post-move periods among 79 randomly selected residents. The sample is representative of and generalizable to the intermediate care facility geriatric residents.

Findings are reported in terms of the interrelationships among three variables or sets of variables: pre-relocation resident attitude about moving (a posited independent variable), post-relocation self-perceived health (a dependent variable) and intervention services (the intervening variable cluster comprised, in the condensed model, of the following two variables: frequency of pre-move tours of the new facility and the proportion of resident pre-move preferences for the new environment which were satisfied). These variables are not interrelated in a simple trivariate correlational model. By means of an analysis of covariance procedure, the coefficients reported in Figure 1 have been adjusted for the effects of pre-existing differences by controlling for those variable used to choose the most vulnerable elderly for intervention services: age, sex, mental and physical functional impairment (as indicated by memory and activity of daily living capabilities), psychosocial adjustment (as indicated by frequency of social interaction, Lawton Morale Scales[39] and pre-move level of self-perceived health), and coping ability (as measured by the variables called Assertiveness and Appropriateness). See Table 2 for more elaborate descriptions of the control variables as well as the independent, intervening and dependent variables. Interrelationships among the adjusted independent, intervening and dependent variables are determined by comparing direct and indirect path coefficients in the manner diagrammed in Figure 1, and allow for an unbiased estimation of the intervention services' stress mitigating effect.

The results indicated a moderately strong direct impact of pre-location resident attitude upon post-move self-perceived health when the effects of the intervention services were controlled. This was represented by a direct path of .431. It should be kept in mind that a direct path coefficient represents the effect of an independent variable upon a dependent variable after the effects of all intervening variables have been controlled. The calculation of indirect effects is the method by which the variance attributable to the intervening variables may be reintroduced into the analysis. The relationship between pre-move attitude and post-move self-perceived health, in terms of the indirect effect, was .148. That is, when the statistical controls on the intervention services variables were released, the path relationship between pre-move attitude and post-move self-perceived health of .431 was reduced to as low as .148. This latter coefficient, .148 represents the effect of pre-relocation attitude on self-perceived health, as mediated by the intervention services. In the terminology of experimentation, .148 would represent the experimental group effect and .431 would represent the control group effect, were a control group employed. Of course, an experiment was not conducted and these coefficients represent simulated experimental and control group effects.

These findings strongly suggest that any adverse impact of negative pre-relocation attitude upon health was largely mitigated by the Loretto intervention efforts. However, the important point is how this conclusion was derived. It was not derived by means of the use of a control group and the denial of intervention services to a needy clientele. It was derived by the use of a methodology employing a correlation between a stress vulnerability variable and a health outcome variable as the basis of analysis in an analysis of

covariance procedure. Differences among clientele, in terms of exposure to intervention services, varied according to measured selection criteria employed by the practitioners. Given the practical ease with which this model can be employed, its avoidance of ethical problems associated with the use of a control group, and experience with its application within The Loretto Geriatric setting, it will constitute a key part of the proposal offered in Part III of this paper.

Figure 1. Path Coefficients Generated by Relocation Research (Condensed Model)

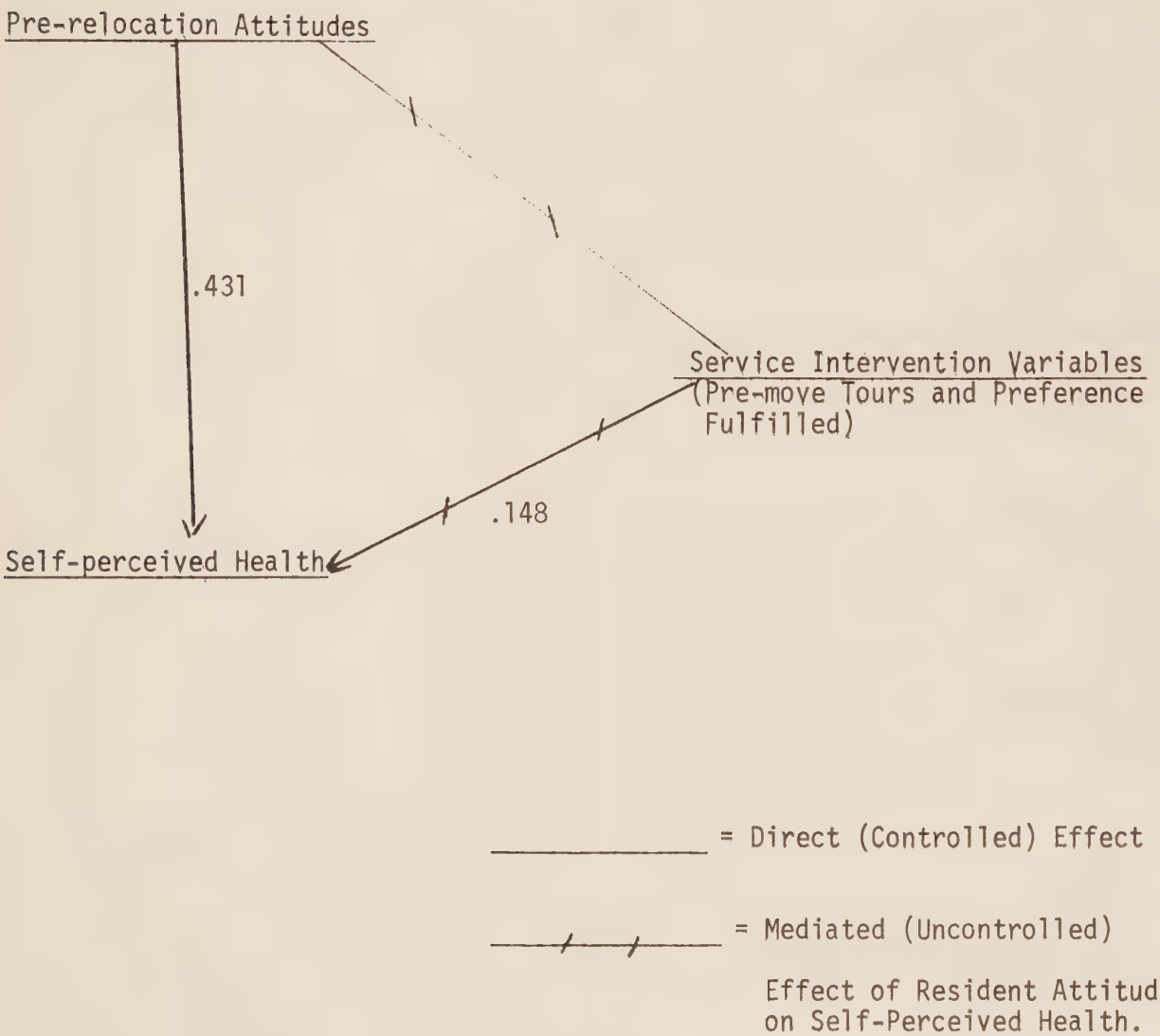


Table 2. Selected Variables used in Relocation Research (Condensed Model)

Item	Description
Control Variables (Covariates)	
Age	Ages vary from 65 to 99.
Sex	The sample is 19.6% male and 80.4% female.
Memory	Only pre-test data were used in this control. Of the respondents 14.3% were rated by three psychiatric social workers as having excellent memories, 51.4% as having good memories and 34.3% as having fair or poor memories. Average level of agreement among the social workers was 97%.
ADL	Only pre-test data were used in this control. Activities on Daily Living is a summated scale based on items pertaining to ambulation, ability to dress and to bathe self. Internal consistency reliability: .91.
Assertiveness	Only pre-test data were used in this control. One of two collateral coping behavior variables based on consensus rankings among three psychiatric social workers (92% level of agreement during round one; 100% by round 3) of resident responses to hypothetical situations involving emergency situations and mistreatment by staff. Ranking dimensions was degree of assertiveness in meeting needs and exercising rights.
Appropriateness	Only pre-test data were used in this control. It is the other of the two collateral coping behavior variables based on the same process described immediately above (94% level of agreement during round 1; 100% by round 2).

Table 2 (Continued)

Appropriateness (continued)	Ranking dimension was appropriateness of responses in relation to likely achievement of desired goal.
Social Interaction	Only pre-test data were used in this control. It is a summated scale based on items pertaining to visits with friends and neighbors, number of Loretto friends, attendance at formal and informal gatherings and active participation therein, family visits, and letter and phone contact with relatives and friends. Internal consistency reliability: .96.
Morale	Only pre-test data were used in this control. It is a summated scale based on the first factor emergent from an oblique factor analysis of Lawton's Morale Scale. Items pertain to little things bothering respondent, worry, and loss of sleep, fear, anger, taking things hard and getting upset easily. Internal consistency reliability: .91.
Self-perceived Health	Only pre-test data were used in this control. It is a summated self-perceived health rating scale based on present health, health in relation to one month ago, one year ago and ten (10) years ago. Internal consistency reliability: .93.
<u>Stress Vulnerability Variable (Independent Variable)</u>	
Pre-relocation Resident attitude	Prior to the move (pre-test data) 38.3% of the residents expressed negative feelings about the prospect of moving, 28.7% expressed positive feelings and 33.0% took a neutral stance.

Table 2 (continued)

Stress Mitigating Service	
Intervention Variables (Intervening Variables)	
Pre-move Tours	The number of pre-move tours taken of the new facility by each resident. Frequencies vary from 0 to 5.
Preferences Fulfilled	The percentage of pre-move preferences satisfied for location in the new facility. Items include floor level, corridor location, room color, view, furnishings, neighbors and attending staff. Variable value is adjusted according to resident's priority ranking among expressed preferences.
Adjustment Outcome Variable (Dependent Variable)	
Self-perceived Health	Only post-test data used in this dependent variable. Same measurement procedure as followed during the pre-test phase of the study (see above). Internal consistency reliability: .94.

Implications of Correlation-based Causal Model Evaluative Research for An Alternative Cost-Effectiveness Research Model in Long Term Care

As noted previously, the central problem in basic cost-effectiveness analysis comes down to this: Because cost-effectiveness analysis is a methodology for assessing and comparing the efficiencies of alternative programs, the efficiency ratio of every program involved in the comparison must be produced in an unbiased manner. The essential solution to this problem, within basic cost-effectiveness analyses which involve outpatient programs for the elderly, has been to incorporate methodologies for estimating secondary and tertiary costs.

Unfortunately, this obvious solution--to include secondary and tertiary costs in the outpatient ratio's cost factor--is a very difficult one to implement. The solution would call for an exhaustive monitoring of secondary and tertiary service utilization among outpatients, placing burdensome record keeping demands on them, e.g., exhaustive personal accounting must be requested including items such as gifts from relatives. In addition to being burdensome, such accounting tends to be unreliable. Paying respondents to participate would improve reliability, but only at prohibitive cost to the research project. Moreover, validity suffers through the inability of researcher to measure the tertiary services' elusive subtle qualities, e.g., as in attempting to estimate the quality of neighborhood police and fire departments as they may contribute to a sense of security and morale. Clearly, an alternative solution to the exhaustive monitoring of secondary and tertiary services is desirable.

The fact that inpatient and outpatient programs serve target populations with different levels of health and psychosocial needs, gives rise to another problem: the need for a common denominator. Gerontologists envision the maintenance of the elderly in their communities through preventive outpatient health programs. Good evaluation of this aspect of outpatient care is possible through a long-term longitudinal experimental design involving a community control group. However, the practical problems entailed by this approach would be formidable. Again, the problems associated with the exhaustive monitoring of secondary and tertiary services would arise. More importantly, an analysis of whether outpatient programs slow the rate of institutionalization could not be conducted for years--until enough time had elapsed for retirement-age elderly populations to reach and significantly surpass the normative age levels for institutionalization. The costs of such an extended longitudinal study would be prohibitive.

Cost-effective alternatives to institutionalization is a major policy issue in need of valid data now, to help contribute to this policy area, a research design is proposed in this paper for conducting a cost-effectiveness analysis of Loretto Geriatric Center's Registrant Services, an ambulatory care program designed to meet varying types of needs among those elderly who desire to remain in the community by providing individualized comprehensive services. To avoid the problems, prohibitive costs and time delays associated with the basic cost-effectiveness model, proposed, is causal model cost-effectiveness research based on path analysis and analysis of covariance. Although it is proposed that this model be applied initially to the Registrant Services ambulatory care program,

its design and its comprehensive outcome assessment information base, allow for a ready extension to an evaluation of home health care. At this time, Registrant Services incorporate limited home health care services.

In the previous section of this paper, the correlation-based causal model approach to evaluative research was described. It is important to keep in mind that cost-effectiveness research based on the causal model approach is nonexperimental, multivariate research. A nonexperimental, multivariate approach enables one to solve the problem of the spurious outpatient cost-effectiveness ratio in a more efficient manner than the basic cost-effectiveness approach. Remember, the outpatient cost/outcome ratio is made spurious by the fact that its cost element does not reflect total community expenditures contributing to the effect element. The rationale for a survey of secondary and tertiary costs is to adjust the cost element appropriately upward. The multivariate strategy is to adjust the effect element downward so that it accurately reflects the effect of primary services only. The ratio would consist, therefore, of a cost element reflecting primary costs only and an effect element reflecting effect causally attributable only to primary services. The result is a cost-effectiveness ratio for outpatient services which is as unspurious as the inpatient ratio, thereby allowing for valid comparison.

The correction involves changing the unit of comparison from change in outcome to change in the relationship (correlation) between patient care needs and outcome. Path analytically, this is accomplished by defining effect as the proportion of overlapping variance between a patient care needs index and an adjustment outcome index which is explained respectively by inpatient the outpatient service utilization indexes--controlling, by means of analysis of covariance, for initial need differential levels across inpatient and outpatient populations. For analysis of covariance control to be an acceptable alternative to experimental control, it is important to remember, as outlined in the causal evaluative model section of this paper, that analysis of covariance is applied in an unbiased manner which neither underadjusts nor overadjusts for pre-existing differences among different clientele populations, when the measurement instruments used to measure outcome are also used as the treatment selection criteria. Given Loretto Geriatric Center's use of a centralized admissions process to all levels of care--one which will consistently employ Loretto's own comprehensive assessment instrument for placement and follow-up purposes--the necessary condition for applying the causal model cost-effectiveness approach is met. Because, under the leadership of AoA, many communities will be moving toward uniform comprehensive assessment, the causal model cost-effectiveness approach is extendable to community-wide model project evaluation.

A unique feature of path analysis, the indirect effect, allows the researcher to isolate the primary outpatient service effect without having to control (and, therefore, measure) secondary and tertiary service effects. This procedure will be explained in detail in the next part of this paper. In addition to resulting in an unspurious outpatient cost-effectiveness ratio, a statistically defined common denominator between differing inpatient and outpatient clientele is attained. This is so because, in performing the described operation, the unit

of comparison has become a type of standard deviation measure of outcome corrected for initial or existing need level differences in inpatient and outpatient populations.

This type of statistical manipulation of inpatient and outpatient survey data, coupled with cost estimates of secondary and tertiary services--but not exhaustive, monitored cost information on secondary and tertiary services--allows for nonexperimental evaluation of alternatives to institutionalization. Further, through analyses of the contingencies of effectiveness, valuable information may be obtained for the modification and improvement of outpatient services as effective alternatives to institutionalization. For example, a subsample of LGC residents enrolled in Registrant Services are also taking up residency in LGC's Adult Home (a domiciliary-type care facility). Analysis may show that it is the interaction of outpatient services with Adult Home living which most cost-effectively serves as an alternative to placement in an intermediate care facility. It is information of this type, made available before another elderly generation grows feeble, which will move alternatives to institutionalization from the gerontologist's drawing board, or the demonstration project phase, into reality.

Part III: A Proposed Cost-Effectiveness Evaluation of Loretto Geriatric Center's Noninstitutionalization-Based Services And A Cross-Validity Test of a Model of Analysis Extendable to Community-Wide and Nation-Wide Alternative Services for the Elderly

Proposal Overview

Proposed is an analysis of covariance and path analytically-based model for evaluating the cost-effectiveness of comprehensive outpatient and inpatient geriatric services. The paradigm is one that purports to resolve problems which characterize existing cost-effectiveness models. As solutions to the stated problems, the model incorporates 1) the expression of an outpatient cost-effectiveness ratio whose effectiveness factor is solely a reflection of the effect of the outpatient program's primary services, unbiased by the effects and unestimated costs of secondary and tertiary services employed by community elderly and 2) a valid common denominator for comparing programs as potentially different as those relating to inpatient and outpatient geriatric services. The model will be applied toward an evaluation of Loretto Geriatric Center's Registrant Service program as a viable alternative to institutional care and as an effective means toward the prevention or retardation of the etiological processes which lead to institutionalization among the elderly. Secondary applications of the regression-based model will include marginal cost-effectiveness evaluations of individual components of the Registrant Service program. The value of the model as a management tool, through its capacity for simulating program changes and estimating the consequences to be expected from proposed changes, is discussed. Proposed also is use of the basic cost-effectiveness technique, which involves collecting cost information on secondary and tertiary services, for the purpose of evaluating Registrant Services. Results generated from the application of the analysis of covariance/path model approach and the basic approach will be compared and the methodologies will be cross-validated. Because the analysis of covariance/path model approach is more readily applied across community facilities, implications will be drawn from the cross-validation for the extension of the model to community-wide and nation-wide evaluations of alternative services for the elderly.

Objective of Proposed Research

The immediate objective of the research to be proposed in this part of the paper is an evaluation of The Loretto Geriatric Center Registrant Service Program as a cost-effective alternative to institutional care (Intermediate Care Facility). Two methods will be employed to reach this objective--one which involves the collection of secondary and tertiary costs information from outpatients and their families, and one method which does not. The long-term objective of this research is to develop and test a methodology for cost-effectiveness research in aging which facilitates community-wide and nation-wide application. A methodology which does not require the burdensome use of

secondary and tertiary costs surveys would facilitate such research, if it can be shown to be as valid as the more traditional methodology. An important part of this research, therefore, involves the cross-validation of the two methods.

The methodology to be tested is an analysis of covariance and path analysis based cost-effectiveness model for evaluating comprehensive outpatient and inpatient geriatric services--one which purports to resolve problems inherent in existing cost-effectiveness models.

Rationale

The goal of the LGC Registrant Service program and most other contemporary efforts on behalf of older persons is to maintain and enhance the independence and general well-being of the elderly.There is little data available, however, to provide adequate guidelines as to the most effective and economical means of achieving this goal. Sophisticated and detailed cost-effectiveness evaluations are particularly scarce. The research proposed here can lead to important and generalizable insights concerning the relative merits of different approaches to this goal. The resulting research data should be of value to gerontological planners, policy makers, and practitioners in a variety of service environments.

Background

The following literature review begins with a brief discussion of the rationale behind outpatient services for the elderly, a general description of LGC's Registrant Service program and a discussion of the problems inherent in cost-effectiveness studies of inpatient and outpatient geriatric services. Solutions to the problems discussed in this section are presented in the methodology section.

Outpatient Geriatric Services

It has been argued that because of the health care system's orientation toward acute illness, many older persons living in the community are not receiving needed preventive and maintenance health services.[40] Further, the emphasis on acute illness care, in terms of what services are available to the elderly in the general community, has created a situation in which the frail and marginally ill are forced to overutilize expensive nursing care beds.[41] In addition to wasting health care resources, this situation prematurely fosters excessive dependency among the marginally ill and frail elderly who consequently come to require institutional nursing care before what would have otherwise been their time.

The basic objective of a registrant service program (or outpatient-type service for the elderly) is to prevent or retard the mental and physical deterioration which necessitates institutionalization. A report on one of the pioneering efforts along these lines describes Sinai Hospital of Baltimore's comprehensive care outpatient program for the aged.[42] The purpose of the

program was to stabilize the older person in the community and prevent his gravitating to illnesses requiring institutionalization. During three years of operation, Sinai was successfully able to provide comprehensive medical care, referral services, short-term counseling and home care to over 250 older persons in the community. Usually the last outpatient service to develop, home health care, was described early in its history as an important factor in preventing unnecessary institutionalization.[43] Pioneering efforts of this type were evaluated primarily in terms of the probable effect of home health service on the total costs of health care; definitive cost-effectiveness studies, attentive to causally related cost and effect differences among alternative modes of health care, are lacking.[44]

As of late, the concept of outpatient services to the elderly has been discussed in terms of the need for the integration of health and social services into a multiservice center.[45] Such a center would enable the provision of a diversity of programs for a diversity of needs. Further, the argument is made that the multiservice center at an institutional setting would allow for sufficient coordination of the older person's long-term care plan because, in part, of the institution's resources and staff's expertise.[46] As has been the case at the Burke Rehabilitation Center, outpatient services in a multiservice center form one level of care which contributes to a continuum of care enabling less encumbered movement of the elderly person to more appropriate levels of care as developing needs demand it.[47] Buttressing this argument for institutionally-based multiservice outpatient programs, are the criticisms of free standing and scattered alternative services which, it is argued, cannot effectively and efficiently serve the community's older population unless they are coordinated into a unified system of care.[48]

A study and summary of a Massachusetts Department of Public Health report, and various other state reports, demonstrates the need for better community health planning for the elderly.[49] The study found a significant number of elderly and handicapped persons confined to nursing homes although they are not in need of sheltered nursing care. The study's authors conclude that it is the lack of basic supportive services in the community and home which accounts for much unnecessary institutionalization. That this situation exists puzzles the authors in light of evidence which they present to indicate cost differentials favorable to outpatient-type services.[50] Of course, the fact that one service may be less costly than another does not necessarily imply that it is more cost effective.

Loretto Geriatric Center is a multilevel of care, multiservice center. The research proposed herein to evaluate LGC's Registrant Service program will offer evidence for or against its cost-effectiveness. The problems which plague cost-effectiveness research, as opposed to simple cost-comparison research, will be discussed following a discussion of Loretto's outpatient offerings.

LGC's Registrant Service Program

The Registrant Service is an ambulatory care program designed to meet varying types of needs among those elderly who desire to remain in the community by providing individualized comprehensive services. The program involves an initial multidisciplinary evaluation of medical, nutritional, social and recreational needs. Services are provided through an outpatient clinic for the ambulatory aged. In addition, as necessary, some services, such as family counseling and occupational therapy, can be and have been provided within the aged person's residence. Whenever possible, other agency resources within the community are brought together to provide needed assistance, enabling elderly individuals to maintain their residence in the greater community.

Ninety-five percent of the nation's population over age 65 do not live in an institutional setting. They live in private homes or appartments and are able to function with varying degrees of independence. As they age, or contract illness, many of these people must seek out specialized supportive or health-related services to maintain their independence in the community. The Registrant Services plan of the Loretto Geriatric Center was designed to recognize and support this majority of elderly people.

The section of the New York State Hospital Code authorizing a nursing home to set up a health-related service for non-residents is Subchapter H, Chapter 5, New York State Hospital Code, and the name "Subchapter H program" has been used to designate these kinds of services. Specifically, Subchapter H authorizes a group of services designed for the ambulatory person who needs care, especially comprehensive care, but does not require it on a 24-hour basis. Registrant Services is a Subchapter H program.

According to the code, the terms outpatient, registrant, and non-occupant are synonymous. Loretto has chosen to call the department "Registrant Services" because it encompasses more than routine outpatient care. Important features of the program include the following:

1) Patients (or registrants) participate in the Loretto Geriatric Center central admission process;

2) There is an individualized plan of care (Registrant Care Plan) for each person accepted for admission;

3) All services of the Center are available to registrants;

4) Registrants are charged on a "fee for service" basis, in accordance with The Registrant Program's comprehensive "Fee Schedule." The same fee applies whether reimbursement is through Medicare, Medicaid or private pay.

The service is presently caring for 468 persons over the age of 62. Many of the registrants (171) reside in LGC's Adult Home. Over the next year, it is anticipated, based on the history of enrollment since 1974 when the service was founded, that over 100 community residents will register for this outpatient service.

As stated in its policy documents, the goals of the registrant service program encompass maintenance and restorative work in the areas of physical functioning, functional state, self-perceived health, independence in ADL, mental functioning, morale and psychosocial adjustment. The listed activities geared toward these goals include:

- Pre-admission comprehensive assessment and evaluation
- Periodic (follow-up) comprehensive assessment and evaluation
- Comprehensive registrant care planning
- Liaison and referral services between registrant and community resources
- Individual and group therapeutic counseling
- Comprehensive telephone counseling
- Episodic and ongoing nursing care
- Episodic and ongoing physician care
- Psychiatric services
- Oral health services
- Ophthalmological services
- Otorhinolaryngological services
- Podiatrological services
- Supportive medical services including:
  - EKG analyses
  - laboratory analyses
  - pharmological services
  - optician services
- Therapeutic services including:
  - occupational therapy
    - ADL training
    - training for the visually handicapped
    - treatment for deficits in muscle strength, joint motion or coordination
  - physical therapy
    - gait training
    - hydrotherapy treatments
    - electrotherapy treatments
    - therapeutic exercise
  - audiology
    - hearing devise evaluation
    - ear hygiene
    - aural rehabilitation
    - audiological counseling and education
  - speech pathology
    - language rehabilitation
    - voice therapy
    - speech therapy

Registrant and family planning conferences
Diet counseling
Consumer counseling (budgeting)
Group diet therapy and weight control
Recreational counseling
Discussion group activities
Individualized recreational services

Cost-Effectiveness Models: Unresolved Problems

Following an intensive review of the relevant literature, Doherty and Hicks conclude that appropriate frameworks and models for the use of cost-effectiveness analysis in geriatric programs are in the developmental stage.[51] Cost-effectiveness analysis in the area of outpatient programs for the elderly will not produce a definitive model until certain conceptual obstacles are overcome. Two major related obstacles are: 1) finding a common denominator for comparing inpatient and outpatient services for the elderly and 2) finding an accurate procedure which would enable an exhaustive cost monitoring of secondary and tertiary services employed by outpatients without placing burdensome record keeping demands on the outpatients or encountering prohibitive costs. To place these problems in perspective and to further elaborate, definitions and clarifications are in order.

As expressed previously, cost-effectiveness is a method for comparing the outcomes of two or more programs or efforts which may be construed to be viable alternatives and whose outcomes are expressible in terms which are not necessarily economic.[52] Health treatment outcomes geared toward a population whose economic productivity is limited are not easily expressed in economic terms. Because the elderly, the case in point, do represent an economically relatively nonproductive group, program outcome measures largely involve physical and mental functioning and psychosocial adjustment.[53]

Ideally, economic terminologies form the common basis for describing program input. Unfortunately, this is not consistently the case. LaVor has concluded that detailed empirical evidence of cost-effectiveness of outpatient versus institutional care for the elderly does not exist because the data are not comparable among components and outpatient cost data are in no way comparable to institutional cost data.[54] Superficially, this is made obvious by the fact that long-term care costs are expressed in per diem terms and outpatient costs in per visit or per service terms. Yet, the systematic comparisons which constitute cost-effectiveness analysis dictate that outcomes, however consistently measured, of alternative programs be compared in relation to a common denominator.

Most commonly and practically, the resources expended by each program serve as the common denominator.[55] This approach runs into difficulty, however, when the services being compared share the same resources. In this case, the issue becomes less one of cost-effectiveness between two viable independent programs and more one of the optimal allocation of scarce resources under goals

and activities constrained by resource limitations. Further, the use of resources as a common denominator in cost-effectiveness studies creates the complicated problem of translation into cost terms. Within the framework of cost-effectiveness, the concept of cost must entail more than dollar expense. Human, psychological or social costs are entailed in the commitment of some resources to one goal while other objectives go unfulfilled. The outcomes foregone by virtue of outcomes pursued are among the costs of the planned outcomes.

The situation involving cost-resources accounting is further complicated when the object of cost-effectiveness studies is a comparison of outpatient versus inpatient geriatric services. For both types of clients, inpatient and outpatient, mental and physical functioning and psychosocial adjustment--standard outcome measures--are functions of each client's total life support system. The identification of resources expended, on a per diem basis, within the inpatient setting closely approximates resources utilized in the total life support system of each client because of the near self-sufficiency of the institution. On the other hand, the daily or periodic costs of an outpatient or registrant-type program, represents only a fraction of all resources used in the outpatient's total life support system. Comparing cost/outcome ratios, especially when outcomes are measured on a longitudinal basis, must bias the results in favor of the outpatient services. Over time, many factors extraneous to the specific outpatient services offered contribute to the measured outcomes, yet the cost/outcome ratio for outpatients will interpret outcomes exclusively as a function of the primary outpatient services. The end result is a spuriously favorable ratio for the outpatient service in comparison to the unbiased ratio for the inpatient service.

An unbiased cost/outcome ratio for outpatients can be established by the determination and documentation of the use of secondary and tertiary care elements within the outpatient's total life support system and by the inclusion of these values in the total cost estimate. Within this schemata, as noted previously, primary services are those directly provided by the outpatient program; secondary services include health and social services provided outside the outpatient setting within the general community; and tertiary services refer to resources utilized by the outpatient in living at home, most notably food and housing expenses. An unbiased comparison of inpatient and outpatient cost-effectiveness ratios must include secondary and tertiary services within the cost estimate for the outpatient program or else the cost-effectiveness ratios for the inpatient and outpatient programs must be adjusted in a compensatory manner. Because the accounting of secondary and tertiary services is often inaccurate by virtue of these services' elusive subtle qualities (for example, attempting to estimate the quality of neighborhood police and fire departments as they may contribute to a sense of security and morale) and because an attempt at exhaustive accounting of secondary and tertiary services makes burdensome and prohibitively expensive demands of record keeping upon the outpatient (for example, exhaustive personal accounting including items such as gifts from relatives), the tactic of statistically adjusting the cost-effectiveness ratios is an attractive one. An important question, therefore, concerns itself with the development of an appropriate statistical model.

The appropriate model must be able to handle the fact that inpatient and outpatient programs have multiple goals and that the target clienteles have different need levels. The registrant-type service aims at preventing deterioration, maintaining or restoring competence in mental and physical functioning and psychosocial adjustment, maximizing independence and preventing or delaying the onset of institutionalization. Institutional geriatric programs also aim at preventing deterioration and maintaining or restoring competence in mental and physical functioning and psychosocial adjustment, and maximizing independence. Of course, preventing or delaying institutionalization is no longer a goal; however, the accomplishment of the first two sets of goals serves a third general goal of minimizing the impact of institutionalization and seeking early discharge into the community (and into less costly outpatient programs) through rehabilitation.

Clearly, the goal structures of the inpatient and outpatient programs for the elderly are compatible. By virtue of the fact that one client group is already institutionalized, the need levels of the two groups are different; nevertheless, the need structures are compatible, i.e., the need factors are the same for each group but require different levels of attention. For outpatients in comparison to inpatients, maintenance in the meeting of needs takes place at a lower level of intensity, restorative work meets with less resistance but preventive work represents a more intensive effort. To be valid, a cost-effectiveness model for inpatient and outpatient program comparisons need not synthesize two incompatible goal and need structures, but rather make cross-structural adjustments for services oriented toward clientele at different need levels. Placed in this perspective, any study problems generated by multiple goals and non-identical clientele become controllable within a cost-effectiveness model encompassing regression-based multivariate statistical procedures.[56]

It is appropriate now to return to the initial two concerns which opened this section: 1) finding a common denominator for comparing inpatient and outpatient services and 2) finding an accurate yet relatively inexpensive and practical method for monitoring secondary and tertiary services employed by outpatients. If program objectives are defined in a manner which confines attention to the primary level of service, the second problem is dealt with. The ensuing lack of exhaustive resource accounting, however, would then deny the evaluator the one major avenue to the elusive common denominator--resources expended across programs. The solution to the second problem would make the first problem all the more insoluable. Such is the nature of the dilemma.

Cost-Effectiveness Models: A Solution

As has already been suggested, a successful solution to the dilemma will begin with the development of a regression-based multivariate model which adjusts for different need levels among the inpatient and outpatient groups and which corrects the respective cost-effectiveness ratios for factors relevant to secondary and tertiary services. Making this adjustment statistically eliminates the need for an exhaustive survey of general community non-Loretto based resources, but prohibits the use of resources as the sole basis for a common denominator. Areas of communality between inpatient and outpatient programs, other than

shared resources, have been identified. The areas of communality include common goals involving identical outcome measures (physical and mental functioning, functional state, independence in ADL and psychosocial adjustment) and common activity orientation (evaluation, prevention, maintenance and restoration). These areas of communality will form the substance of the common denominator. How these elements will be weaved into a statistical model which evaluates the cost-effectiveness of the Registrant Service program while avoiding the above discussed problems and dilemmas will be made explicit through the detailed presentation of that model.

Methodology

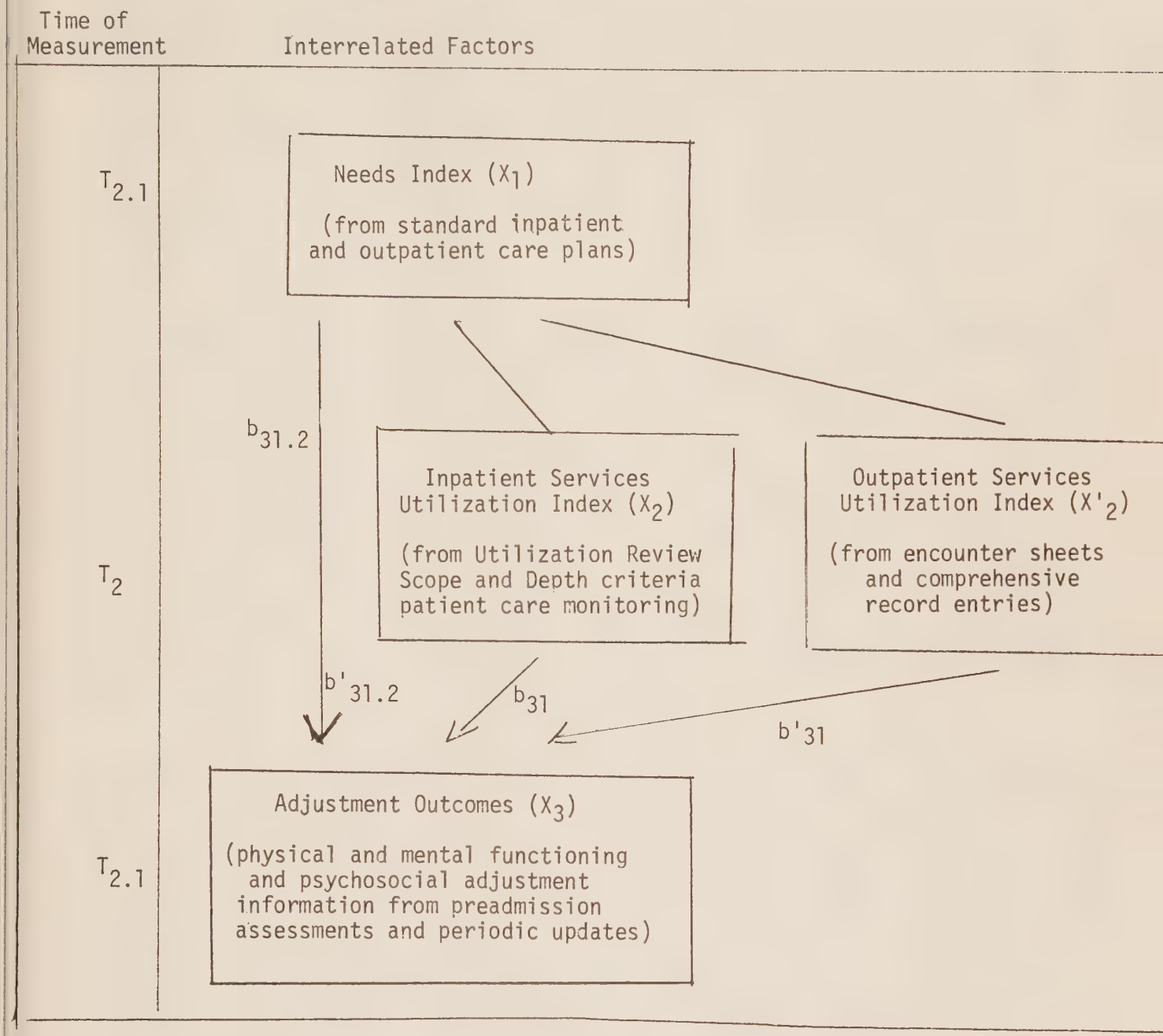
The methodological design is presented in schematic form in Diagram 1. Illustrated in Diagram 1 are two independent path analyses based on measurements derived from common procedures. Because relative cost-effectiveness will be based on cross-model comparisons, unstandardized regression coefficients, as opposed to beta weights, are employed as path coefficients--hence, use of "b" as the path coefficient symbol.[57]

For the inpatient model the direct effect of the resident needs (as they change over the time period of the analysis and as they are measured within standard care plans) on resident adjustment outcomes (as they change over the time period of the analysis and as they are measured by pre-admission and follow-up assessments employing standard physical and mental functioning indices and psychometric batteries) is estimated by $b_{31.2}$. That is, this direct effect is an estimate of the consequences that the needs and problems of the inpatients would have had upon physical and mental functioning and psychosocial adjustment had services not been utilized or offered. As such, the direct effect functions as the crucial control group comparison point internal to each model within this correlational (no actual control group) design.

In part, because of the pitfalls inherent in the use of change scores for measuring and analyzing changes in needs and outcomes over time, another procedure for measuring change analysis of covariance is employed. Direct and indirect path coefficients are calculated on the basis of Time Two measurements only; however, controls are instituted for all Time One measurements of needs and outcomes. Hence, time of measurement for needs and outcomes is expressed in Diagram 1 as $T_{2.1}$ indicating the use of Time Two measurements in the model after variance attributable to the effects of Time One starting levels have been partialed out. This serves not only as a valid technique for dealing with some change score problems but also effectively adjusts for preservice delivery differences in needs and initial outcome adjustment levels among registrants and residents.[58] In regard to service utilization indices for both inpatients and outpatients, T_2 (Time Two) is expressed in Diagram 1 as the time of measurement because the cumulative effect of services on the relationship between needs and adjustment outcomes at Time Two is what is under scrutiny.

The indirect effect of inpatient needs on inpatient adjustment outcomes, as that effect is mediated or determined uniquely by inhouse programs and service

Diagram 1. General Cost-Effectiveness Path Analytic/Analysis of Covariance Model.



Hypothesized Results:

$$\frac{b_{31}/b_{31.2}}{\text{Cost (per diem rate)}} < \frac{b'_{31}/b'_{31.2}}{\text{Cost' (calculated on a per diem basis)}}$$

utilizations, is represented on Diagram 1 as b_{31}. This indirect effect is calculated by path analytic procedures which release the controls on service factors but do not effect controls on Time One needs and outcome adjustment levels. The indirect to direct effect ratio, therefore, expresses an estimate of the extent to which the potential adverse influence of unmet needs upon adjustment levels was reduced by programmatic interventions. The ratio $b_{31}/b_{31.2}$ is a measure of total inpatient service effect. Because institutionally-based life support systems tend to be total life support systems by the virtue of the self-sufficiency of the institution, primary, and what would be defined as secondary and tertiary services from the outpatient perspective, are encompassed by the effect $b_{31}/b_{31.2}$.

With the exception of how one interprets the effect ratio, the second model (outpatient services) parallels the first. Distinctions are made between the two sets of effect components by the use of an accent. Therefore, $b'_{31.2}$ refers to the direct effect of changing registrant needs on changing registrant outcome adjustment levels and, correspondingly, b'_{31} refers to the effect of needs on outcome adjustment levels as mediated or determined uniquely by outpatient services. As the ratio $b_{31}/b_{31.2}$ is a measure of inpatient service effect, so then is $b'_{31}/b'_{31.2}$ a measure of outpatient service effect. However, this estimate of outpatient effect is free of bias in relation to how secondary or tertiary services may have contributed to outpatient adjustment level outcomes. This last point is sufficiently important to warrant elaboration, because in comparing the two models' respective effect ratios, the elusive common denominator has been attained. Moreover, although the model requires a survey of resource expenditures for inpatient and outpatient services, the common denominator has been arrived at without an impractical, burdensome and costly survey of secondary and tertiary services used by outpatients.

Consider the standard cost-effectiveness ratio which is simply expressed as objectives attained (effect) over resources expended (cost). The effect component of this ratio is in no way causally linked to program variables and, therefore, represents a mere description of what objectives were obtained at a given point in time. There is no consideration given to the possibility that the same outcomes (or some thereof) may have been attained at the same point in time without benefit of the program in question. For example, if after a given amount of time, registrants appear to be at a higher level of psychosocial adjustment, the standard measure of effect would attribute this change to the primary services received through participation in the outpatient program. This conception of effect is biased in favor of the outpatient program to the extent that community based secondary services and home based tertiary services contributed to the higher level of psychosocial adjustment. The implicit assumption of no extra program influence is more acceptable for the inpatient program, which tends to consist of a total life support system, than for any outpatient program.

The value of the $b'_{31}/b'_{31.2}$ measure of effect is that it represents only that portion of adjustment outcome change attributable to (path analytically mediated by) outpatient program factors (primary services). Correspondingly $b_{31}/b_{31.2}$ measures effect that represents only that portion of adjustment outcome change attributable to (path analytically mediated by) inpatient program

factors. These two measures of effect, therefore, when employed as numerators in the more complex ratios whose denominators include respective cost factors, render cost-effectiveness ratios which are perfectly comparable across inpatient and outpatient programs.

The cost denominators must be expressed in comparable terms. Institutional costs are often expressed in terms of per diem rates, and registrant services in terms of fees for services (per visit). For study purposes, outpatient (registrant) service costs can be recalulated on an average per diem basis.[59] Because total institutional costs include fees for needed extra-facility services, the flat per diem rate for those receiving institutional care will be adjusted upward, using an averaging technique, in the analysis.

The appropriate inpatient and outpatient cost-effectiveness ratios are therefore $(b_{31}/b_{31.2})$/cost (per diem) and $(b'_{31}/b'_{31.2})$/cost (calculated on a per diem basis), respectively. If a program such as Registrant Services is truly a cost-effective alternative to institutional care, study results should conform to the following relationship:

$$\frac{b_{31}/b_{31.2}}{\text{cost}} < \frac{b'_{31}/b'_{31.2}}{\text{cost}'}$$

(per diem rate) (calculated on a per diem basis)

Further, the path analytic foundation of the cost-effectiveness model should offer a basis of statistical evidence for valid statistical induction and inference regarding the question of the viability of the Registrant Service program as an alternative to institutionalization, especially in regard to the issue of Registrant Services in conjunction with Adult Home Living functioning as a viable alternative to ICF care.

Concurrently with this analysis will proceed the application of the basic cost-effectiveness methodology--one which requires the collection of data on secondary and tertiary expenditures by outpatients. The method of analysis to be employed will be the Kazanowski tabular display approach, outlined and footnoted in Part I of this report. The data collection procedures to be employed for the measurement of secondary and tertiary expenditures will be based on the "Levindale Geriatric Research Center Cost of Living Data Sheet"[60] and are outlined in the next section of this proposal.

Measurements and Samples

All Loretto Geriatric Center registrants and residents are admitted through a central admission process. As noted in Part I of this document, Loretto Geriatric Center is in the process of completing work on its own comprehensive battery of assessment and effectiveness instruments derived from DMS-1, PACE, OARS and others. An outcome assessment instrument, to be pre-tested and put in use by the fall of 1980, will become an integral part of the LGC admissions

process and quality assurance information system. In addition to measuring physical, mental and social functional abilities, the outcome assessment instrument will include measures of the quantity and quality of informal support strengths (including family support). In addition to this information, which includes self-assessed health, objective health information will be obtained from the required physical examination. Health information in the Loretto record is amenable to morbidity scaling by The Wyler, Masuda and Holmes method.[61] These measurements, to be taken again 6 months and one year following admission, will constitute the adjustment outcome information base for the general cost-effectiveness path analytic model. Because admission applications include basic demographic data such as age, sex, race, SES, etc., these variables will also serve as controls in the statistical process which adjusts both samples for pre-study differentials.

The needs index for each group will be derived from the standard patient care plan format completed for every registrant and resident at time of admission and updated periodically thereafter. For the inpatient group, the service utilization index will be derived from information presently collected on an ongoing basis as part of the Utilization Review process and Loretto's unique auditing system which involves all direct resident care divisions. Each of these divisions has set up criteria by which the scope and depth of their services are to be appraised within an ongoing process of audit and self-evaluation that lends itself to quantitative analysis. For the outpatient group, the service utilization index will be derived from registrant encounter forms which detail all services and therapies rendered. These forms include billing slips and appointment log sheets.

Primary program expenditures will be calculated according to standard principles of cost accounting. In order to cross-validate the path analysis and analysis of covariance based model of cost-effectiveness evaluation, data will have to be collected from registrants and/or their families for the purpose of estimating secondary and tertiary expenditures within the Kazanowski basic cost-effectiveness analysis approach. This information will be collected twice during the first year of analysis, retrospective of 6-month blocks of time. The instrument to be adopted for this purpose is the "Levindale Geriatric Center Cost of Living Data Sheet."[62] It requests information on monthly rent and utilities costs (or house payments), visits to doctors and clinics outside the evaluated outpatient setting, hospitalizations, special treatments during any hospitalizations, emergency room uses, lab work, other community services and the related costs of the above service items. It also requests information on public and private transportation expenditures, food, clothing and entertainment or recreational costs. Costs for paid help at home, medications and rentals or costs for prosthetic aids are also estimable given the requested information.

As indicated by the Time Two controls specified for the path analysis and analysis of covariance model, the data collection design is a longitudinal one. Time One, or baseline data, is collected at time of admission. Under the developing Loretto Geriatric Center assessment and quality assurance system, client outcome change will be monitored at least semi-annually. The new assessment

system, goes into place in September of 1980. The period between September 1980 and September 1981 will define sample size in terms of the number of new registrants and Intermediate Care Facility residents with complete initial assessments. Based on admissions histories, it is estimated that total sample size will be about 200--a size adequate for multivariate research of this type. Since the last research subject arrives in August of 1981 and is not reassessed until February 1982, data collection will not be completed until the latter date. Data analysis and report writing, therefore, are reserved for the remainder of 1982.

Human Subjects

With the exception of the "Levindale Cost of Living Data Sheet," all of the information collected for the proposed research is collected on a routine basis at LGC as part of its patient - monitoring and internal accounting systems. In large part, therefore, residents and registrants are not being subjected to the described measurement procedures exclusively for the purposes of this study and the research is largely of secondary nature.

"The Levindale Cost of Living Data Sheet" will be administered only with the informed consent of the registrant. The process of informed consent will involve explanation to the registrant of the purpose of the study by the registrant's assigned social worker. The social worker must be satisfied that the registrant wishes to participate. All information will be confidential.

Because the information collected during all measurement procedures is used for resident/registrant patient care plan development, the information will be shared with resident/registrant care team members. These team members, and other professionals with access to the resident record, already understand and respect the confidentiality of the information by virtue of LGC policy. Of course, any published reports will include only group statistics and anonymous quotations.

Secondary Applications of The Regression-based Model

Although the model developed herein represents an original attempt to apply regression-based statistics to the cost-effectiveness evaluation of alternative programs, regression analysis has previously been employed as a tool for the evaluation of individual program elements in terms of marginal cost-effectiveness.[63] Research procedures and computer programs which will be established as a result of this study, will be available, therefore, for the marginal cost-effectiveness evaluation of the various elements and activities of the Registrant Service Program including home health care services (and, with some modifications, of the inhouse programs as well).

The analysis would involve regressing the effectiveness measures discussed in the body of this proposal with costs associated with each element or activity of the Registrant Service Program. Costs would be calculated on the basis of

the dollar equivalents of time spent with registrants in terms of personnel, expenditure materials and other factors employed in the service utilization indexes. Time estimates would be important as the basis for weights in allocating a given program's or activity's budget on a per registrant basis. In addition to change scores relevant to effectiveness and cost, variables relevant to the demographic or other characteristics of the registrant (e.g., sex, age) can be entered into the equation as controls on nonprogram factors which may contribute spuriously or in an intervening manner to effectiveness readings.

Setting the constant of any such equation to zero would result in the generation of beta weights each of which would represent marginal cost-effectiveness ratios relevant to specified program components. This is true because the beta weight is properly read as the change in cost, in terms of a proportion of one standard deviation unit, associated with a change of one standard deviation unit of outcome (effect).

The resulting system of equations lends itself to use as an effective management tool through simulation. For example, in order to measure the impact of given activities on the care system as a whole, one need merely suppress the cost variable or variables associated with the activity under examination and recalculate the regression equation. Comparing the newly generated beta weights with the original would result in simulated estimates of changes in cost-effectiveness for all other (nonsuppressed) activities and programs. The sum of all such changes is the estimate of the suppressed activity's contribution to the effectiveness of the other activities and programs in Registrant Services. The value of such a simulation tool is that it allows for an evaluation of a specific activity without the actual suppression of the activity and an attending evaluation of the consequences for the total care program. Interestingly, a given activity's cost-effectiveness may be shown to be low, but its catalytic or contributory (complementary) effect on interrelated activities or programs may, nevertheless, be shown to be great. A research/management tool of this type would be indispensable for the effective and efficient running of any multidisciplinary service.

Specific Aims: Time Table

September 1980 - August 1981:	Collect base-line information for effectiveness and cost components;
November 1980 - February 1981:	develop coding conventions; write computer programs for validity and reliability testing of measurement instruments, based on first six months of data collection;
March 1981 - April 1981:	code first six month's information; keypunch data;

May 1981 - February 1982:	run validity and reliability programs; analyze findings, summarize for interim report; recode and rescale measurement instruments;
February 1982 - April 1982:	code and keypunch data based on first twelve months of data collection; prepare data for computer analysis; write computer programs for statistical analysis of data;
May 1982 - August 1982;	empirical testing and analysis of cost-effectiveness path analytic model, testing and analysis of basic cost validation model; cross-validation, analysis of Registrant Services/Adult Home as alternative to ICF;
August 1982 - September 1982:	subanalyses of model components (service by service cost-effectiveness analyses, including home health care).
September 1982 - December 1982:	preparation of final report and publication drafts including statement, based on statistical induction and inference, on the viability (cost-effectiveness) of the Registrant Service program as an alternative to institutionalization; and on the utility of the path analytic model for community-wide and nation-wide cost-effectiveness analysis.

Significance

The importance of this proposed research lies in its potential for advancing the validity of cost-effectiveness research and for facilitating the implementation of alternative programs for the elderly. The proposed synthesis of standard cost-effectiveness models with path analytic and analysis of covariance procedures is a novel contribution of the approach outlined in this document. To the extent that a definitive contribution is made to the cost-effectiveness analysis of outpatient services for the elderly, alternatives to institutionalization as designed by gerontological planners will be more likely to move from the drawing board into reality, where health-related consequences, in terms of maintained or enhanced independence, will ensue for the elderly.

Facilities Available

Loretto Geriatric Center conceives of itself as a community resource for knowledge and expertise in the field of aging. In keeping with this conception, Loretto has become an integral part of the AoA/IVE sponsored Syracuse Consortium, which includes The All-University Gerontology Center of Syracuse University, The Upstate Medical Center of the State University of New York and the Metropolitan Commission on Aging. Loretto, therefore, is committed to community oriented research and makes facilities available for this purpose. Ample space is available, for example, for research-related activities in a suite of offices in the center's main building basement.

For the research, the bulk of the analysis will take place on the IBM 370/155 Computer at Syracuse University. Because it is a member of the university associated Consortium, Loretto is eligible for a computer account at the Syracuse University Computer Center, with full user rights at discount rate. The information storage and retrieval process and some of the analysis will proceed on the mini-computer system that Loretto Geriatric Center will have in place by the fall of 1980. The developer of the specifications for Loretto's computer system has been working closely with the research personnel and consultants involved in developing the cost-effectiveness and assessment, placement and quality assurance systems for Loretto.[64] With great forethought, therefore, Loretto facilities, resources and capabilities are tailor-made for the proposed research which will forward Loretto's service objectives, the Consortium's planning objectives and The Administration on Aging's policy objectives for the 1980's.

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